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OF THE

Philadelphia College of Pharmacy.

VOL. I. DECEMBER, 1825. NO. I.

CONTENTS.

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INTRODUCTION.

THE history of the progress of society is that of the division of labour, and there is no surer indication of advancement in the arts of civilization, than the multiplicity and subdivision of occupations. The present undertaking will, it is believed, happily illustrate this truth. In the first stages of the colony, the storekeeper was a dealer in all kinds of merchandise. He imported whatever he could sell, dry goods, groceries, ironmongery, books, paints, and medicine. Gradually the demand for each of these increased, and men devoted their capital and labour to vending merchandise of one species. The business of the apothecary was long a subordinate branch of the establishment of a physician, or carried on by the man who was at the same time a druggist and dealer in paints. Latterly, however, it has been nearly abandoned, both by the medical profession and the wholesale druggist. The drug factor, the druggist, the manufacturing chemist, the drug powderer, the paint and oil dealer, the varnish maker, and the apothecary, now divide and multiply the business which formerly centered in a single tradesman. In proportion as

the apothecary devoted himself to the cultivation of his appropriate art, he found it to become important and complicated. Its intimate connexion with modern chemistry has elevated it to the rank of a science; a complete mastery of all its details implies the knowledge of the manufacturer, the merchant, the physician, and the naturalist; and it requires to be pursued, not merely with the frugality and industry of a tradesman, but with the patient sagacity of an investigator of nature.

The necessity of keeping pace with the progress of the age, has long been felt among the druggists of Philadelphia. Accidental circumstances led them, in 1820, to associate for purposes of mutual benefit, and out of this union grew "The Philadelphia College of Pharmacy." This association, which originally comprehended sixty-eight druggists and apothecaries, or about one half the number in the city and liberties, was incorporated in 1822. As the first regularly organized school of Pharmacy in America, its establishment forms an era in the medical history of our country. Confining itself to objects of common and public utility, it has no feature of a monopoly. Its labours are restricted to the instruction in the school of Pharmacy, to the examination and inspection of drugs, to the preservation of harmony and correct conduct among its members, and to the cultivation of Pharmacy, and of a taste for science. Its influence in all these respects, and its growing reputation abroad, are already obvious.

More fully and extensively to achieve those purposes, it has decided to publish under its authority, "The Journal of the Philadelphia College of Pharmacy." This journal will be published in occasional numbers of

about 32 pages each, and will contain original essays, such transactions of the college as may be ordered for publication, and selections adapted to the nature of the work, from scientific books and journals.

The success of similar journals in Europe, encourages the hope that this may become both useful and creditable to the apothecaries of the United States. The "Bulletin de Pharmacie," afterwards the "Journal de Pharmacie," has been conducted for thirty years, by the "Pharmaciens" of Paris: it has added much to the knowledge of the age, and is a record honourable to the industry and attainments of its contributors. The genius of some of the most eminent chemists of the last and present age, received its first impulse and direction in the laboratory of the apothecary. Similar results will no doubt follow from the same causes in America. We have here, as there, a learned and discerning body of patrons and judges in the medical profession. Men versed in all the requisite sciences, will here, as there, engage in the business. A more liberal education, the competition of business, the rapid diffusion of information, will combine to raise the apothecary to the respectable rank which he occupies in Europe. Should the Journal of the Philadelphia College of Pharmacy contribute to these results, by awakening and fostering a spirit of research and experiment, although labouring in an obscure and humble portion of the vineyard of science, it will reap rewards, honourable to its contributors, and useful to the world at large.

CONDITIONS.

I. The Journal of the Philadelphia College of Pharmacy, will consist of original and selected papers on subjects connected with Pharmacy and Chemistry, and of such transactions of the College, as may be ordered for publication. It will be issued by the publishing committee, in monthly numbers, or as often as the materials in hand enable them to do it.

II. The price for each number, of 32 pages, will be twenty-five cents, payable on delivery.

III. The outside covers will be used as advertising sheets, at the rate of three dollars per page, for each page, with a discount of one-third to members of the college.

Original or selected communications are requested to be addressed to either of the publishing committee.

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Publishing Committee.

Philadelphia, Nov. 7th, 1825.

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ORIGINAL PAPERS.

On the preparation of Glauber's and Epsom Salt and Magnesia, from Sea Water, by DANL. B. SMITH.—*Read October*, 1825.

The fact that nearly all the Glauber's salt consumed in America is prepared from sea water, and the silence of authors in relation to this mode of obtaining it, will give interest to the following details. They have been communicated by a gentleman who was formerly engaged in large salt works in Massachusetts, at which all these salts were manufactured.

The brine at these works is pumped into vats of the capacity of six hundred or a thousand hogsheads, where it is concentrated by evaporation in the sun to the strength of a saturated solution. It is then drawn off into a second vat, called the pickle vat, of about half the size of the first, in which it is cleared from impurities, and thence transferred to a third still smaller vat, in which the evaporation is finished and the common salt formed. When crystals of Epsom salt begin to deposite, the mother water is drawn off, and kept, under the name of Bitterns, for the Epsom salt and magnesia works.

The season for making salt is over by the end of October, and the large vat is then filled with brine, which the sun and high winds of the two succeeding months concentrate to the strength of pickle. This is drawn off into the pickle vat, in which it remains till spring, when it is transferred to the third vat and evaporated to obtain the common salt. During, however, the extreme cold weather, a crystalline deposite is formed, consisting chiefly of sulphate of soda, which is taken out with iron rakes having strainers attached to them, and then purified for sale by recrystallization. The best formed crystals are sometimes dried and sold in their impure state.

The bitterns consists chiefly of sulphate of magnesia and hydrochlorates of magnesia and lime, of which the latter two do not easily crystallize. It is evaporated slowly, and the Epsom salt may, with proper care and washing be obtained very pure. When evaporated too hastily it is mixed with hydrochlorate of magnesia, a very bitter and deliquescent salt.

To obtain the magnesia the bitterns is diluted to a certain standard (upon the strength of which the degree of the firmness and compactness of the magnesia is said to depend) and mixed with a solution of pearl ash. The precipitate is repeatedly washed in water, which is at first hot and gradually cooled, till it comes off quite tasteless. The box in which it is washed is twenty-five feet in length by twenty feet in breadth, and three in depth, and has a strainer of canvass for a bottom. When sufficiently pure, the magnesia is allowed to thicken, and is then poured into square moulds placed on canvass strainers. When these are full, and the magnesia has obtained the proper consistence, the moulds are lifted off, and the

next day the magnesia is removed into the drying oven, where it is kept for forty-eight hours, at a temperature of 190°, then taken out, scraped, and packed up for sale.

In attempting to investigate the rationale of these processes, I shall assume as correct the experiments of Dr. Marcet, published in the Philosophical Transactions for 1819. This excellent chemist obtained from five hundred grains of sea water from the middle of the North Atlantic ocean, having the specific gravity of 1.02886 the following precipitates :

	grs.			grs.
Chloride of Silver, -	42	equivalent to	Chlorine, - -	10.356
Phosphate of Magnesia, -	2.7		Magnesia, - -	1.125
Sulphate of Barytes, - -	3.85		Sulphuric Acid, -	1.305
Oxalate of Lime, - -	8		Lime, - -	.35
			Sodium, - -	6.037

The state in which these elements exist in sea water is involved in much obscurity. According to the temperature employed in the evaporation, we procure from it either sulphate of lime, sulphate of magnesia, or sulphate of soda. It is therefore evident that a change of temperature is sufficient to disarrange the combinations that usually obtain.

If we suppose the sulphuric acid to exist in combination with soda, the following may be considered as the composition of 1000 grains of sea water.

Sulphate of Soda, - - -	4.698 grs.
Hydrochlorate of Magnesia, - -	6.4125
——————— Lime, - - -	1.625
Chloride of Sodium, - - -	26.27

If it be combined with magnesia the following arrangement may be considered as obtaining :

Sulphate of Magnesia, - -	3.915 grs.
Hydrochlorate of do. - - -	2.69325
——————— Lime, - -	1.625
Chloride of Sodium, - - -	30.185

The latter formula agrees better than the former with the medium proportion of salt, (which is about three per cent.) in sea water. If sulphate of soda be the salt naturally in solution, I know of no law to determine the formation of sulphate of magnesia. If the latter salt be the one ready formed in sea water, the production of sulphate of soda during intense cold will be in agreement with two known laws. One of these is, that solutions of sulphate of magnesia and chloride of sodium decompose each other when exposed to a freezing temperature, as first remarked by Gren. The other is the very remarkable law of solubility of sulphate of soda. At 32° F. 5.02 parts of the dry salt are soluble in 100 parts of water, and 50.65 parts at 102°; whereas the solubility of chloride of sodium is scarcely affected by the temperature. The pickle in which the Glauber's salt forms, is a nearly saturated solution of salt, and remains liquid at zero. At this temperature almost the whole of the sulphate of soda will crystallize. It is therefore probable, that the sulphuric acid exists in sea water in combination with magnesia.

The formation of Glauber's salt cannot be advantageous to the manufacturer. It lessens the production of common salt about thirteen per cent.; and though the same quantity of magnesia can be obtained from the bitterns, it will not yield Epsom salt.

It is much to be wished that accurate observations should be made on the spot, of the composition of the bitterns, and the various phenomena occurring at a salt works. Much advantage would result to the manufacturer in point of economy, and new light be thrown upon an obscure and intricate subject.

Remarks on the Common Hydrometer, with a description of a new method of graduating that instrument. By DANIEL B. SMITH.—*Read October*, 1825.

The most exact method of ascertaining the specific gravities of fluids is undoubtedly, to weigh carefully, equal bulks of them. This mode however is troublesome, and not always practicable. Advantage has therefore been taken of the law of hydrostatics, that a floating body will displace a quantity, which is inversely as the weight, of the fluid in which it swims. The hydrometer is constructed upon this principle—being a bulb with a long stem, so loaded that the two extremes of the stem will mark the lightest and heaviest fluids in which the instrument is to be tried. When proper care is taken in its construction the results which it gives are perfectly correct, although not capable of being observed with as much exactness as those of a good balance. The hydrometer in common use (that of Baumé) is of two kinds, one for spirits and the other for saline and acid solutions. The former is graduated by making the point to which it sinks in distilled water, ten degrees of the scale, and that to which it sinks in a solution of one part, by weight, of dry muriate of soda in nine parts of water, zero; the instrument being so loaded that zero is at the lower end of the stem. In the latter the instrument is loaded so as to sink to the top of the stem in distilled water, which point is made zero; while the point to which it sinks in a solution of fifteen parts, by weight, of dry muriate of soda in eighty-five parts of distilled water, is marked fifteen degrees. The instruments are graduated by marking off equal divisions of these degrees

respectively upon the stems. It is an objection to this mode of graduation, that by taking as starting points so small a part of the scale, the error of observation, if any, is multiplied in the higher numbers. Another objection, which applies equally to all the hydrometers in common use is, that the scales are altogether arbitrary—that they will not compare with each other, and are not intelligible to the general student.

To avoid these inconveniences it is proposed to construct an instrument, of which one hundred degrees shall represent an increase or decrease of two-tenths of specific gravity, water being zero, and the scale equally divided. As the depth to which it will sink, or the quantity of fluid which it will displace is in the inverse ratio of the specific gravity of the fluid, it is easy to ascertain the precise value of each degree of the scale in terms of specific gravity. Taking the specific gravity of water as 1. and that indicated by one hundred degrees of the instrument at .8, let it be required to find the specific gravity (S) indicated by any other degree (n) of the scale. Put x = the bulk of water displaced by the instrument, y = the bulk of each degree of the stem, and $x+100y$ = the bulk of liquid of the specific gravity of .8, which will be displaced. Then as $1. : .8 :: x + 100y : x$ $\therefore x = 400y$; and as $1 : S :: x + ny : x = \frac{nSy}{1-S}$, whence $S = \frac{400}{400+n}$. In the hydrometer for liquids heavier than water, in which one hundred degrees represents a specific gravity of 1.2, this formula becomes $S = \frac{600}{600-n}$ and $x = 600y$. From these data the numbers in table No. II. are calculated.

It is obvious that the scale here described is applicable to all the purposes for which the hydrometer can be used; that it is easily convertible into terms of specific gravity, and that great advantages would result from the general use of this or one similar. Any part, high or low, of the scale, can be adapted to an instrument with perfect accuracy; and its range can be extended so as to include the lightest and heaviest liquids, and the value of tenths and hundredths of degrees ascertained and observed.

A disadvantage of this and the common hydrometer is, that if the degrees of the stem be sufficiently large for accurate observation, the range of the instrument becomes very limited or the stem inconveniently long. In Nicholson's, which is a very correct but somewhat inconvenient hydrometer, this defect is obviated by surmounting the stem with a flat dish and sinking it with weights to a constant depth. In Aikin's and Sike's, weights are added to that part of the instrument which is immersed in the fluid, and the strength above or below a certain standard, represented by each weight, is measured on the scale. In this instrument a calculation is necessary of the value of each degree of the scale for every weight that is used, as both the weight and bulk of the hydrometer are altered thereby. There are none of them as simple in principle and as convenient in practice as the instrument now proposed, in which we can attain the same object (of shortening the stem and preserving its range) without altering the principle of the graduation.

Let the stem be of solid metal, drawn out to a perfectly uniform diameter, and the pear-shaped appendage to

the bulb be loaded with an extra weight equal to eighty degrees of the stem. Let then the length of stem equal to twenty degrees be ascertained by experiment, and the stem cut off a little beyond that mark. This length can be measured off on an exactly similar rod of metal, and circular discs of the same density and weight, and pierced like the weights of Aikin's hydrometer, easily formed. If we take four of these, attach them to the summit of the stem and lighten the bulb till the instrument again sinks to the same mark in the same fluid, it will evidently give the same measurements as high as the twentieth degree, as if the weights were drawn out to the diameter of the stem and graduated to one hundred degrees. Let then one of the weights be taken from the top and attached below the ball of the instrument, and it will measure from twenty to forty degrees; if two are shifted it will measure from forty to sixty; from sixty to eighty, if three are shifted; and from eighty to one hundred, when all are immersed in the liquid.

The advantages of this arrangement are obvious; its principles are applicable to any number of degrees as well as to one hundred, and whatever part of the scale be taken for the range of the instrument.

The use of the hydrometer is much limited by the unequal expansion of different fluids by heat. It must always be used at the same temperature, unless the law by which the fluid expands be known. The various mixtures of alcohol and water, are the only liquids which have been subjected to experiments sufficiently multiplied to enable us to apply the requisite correction for heat.

The table No. I. is calculated from the very copious tables prepared by direction of the British Excise, and published in the Philosophical Transactions, for 1794. It exhibits the per centage of alcohol of .825 specific gravity, indicated by each degree of the hydrometer for every five degrees of temperature, from 30° to 80° of Fahrenheit. The usefulness of this table, will, it is believed, compensate for its length. Its accuracy is affected by the expansion of the instrument itself, which therefore requires to be investigated. The mean of the best experiments gives .00057 as the expansion in bulk of brass in passing from 32° to 212°. In graduating the hydrometer, the mean temperature of 55° is to be employed; so that the expansion is to be ascertained for twenty-five degrees. This will be .003167, or less than one-thirtieth of a degree; a quantity imperceptible to the eye. Of the other materials used in the construction of hydrometers, glass and platinum expand about half as much as brass, and gold and silver nearly in the same ratio.

TABLE NO. I.

The quantity of Alcohol of the specific gravity of .825 contained in 100 parts of Liquid for every degree of the Hydrometer, and every 5 degrees of Fahrenheit's Thermometer.

	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°
90											99.69
89										99.94	99.17
88										99.42	98.65
87									99,66	98.90	98.12
86								99.87	99.14	98.36	97.58
85								99.35	98.59	97.83	97.04
84							99.55	98.81	98.05	97.28	96.48
83						99.77	99.02	98.27	97.50	96.72	95.91
82					99.98	99.23	98.48	97.72	96.94	96.15	95.33
81					99.44	98.68	97.93	97.17	96.38	95.58	94.75
80				99.63	98.90	98.13	97.38	96.60	95.82	94.99	94.15
79			99.80	99.08	98.33	97.57	96.81	96.03	95.23	94.40	93.55
78		99.97	99.26	98.54	97.79	97.	96.24	95.45	94.64	93.80	92.94
77		99.43	98.70	97.98	97.22	96.43	95.65	94.87	94.04	93.19	92.32
76	99.58	98.88	98.14	97.41	96.64	95.83	95.06	94.26	93.42	92.56	91.68
75	99.03	98.32	97.57	96.82	96 05	95.23	94.45	93.64	92.79	91.93	91.04
74	98.47	97.76	96.99	96.23	95.45	94.62	93.83	93.	92.14	91.27	90.38
73	97.90	97.19	96.40	95.63	94.84	93.99	93.19	92-36	91.49	90.61	89.71
72	97.32	96.53	95.80	95.01	94.21	93.36	92.55	91.71	90.83	89.94	89.04
71	96.72	95.85	95.18	94.39	93.58	92.73	91.90	91.05	90.17	89.27	88.36
70	96.12	95.30	94.56	93.76	92.94	92.08	91.24	90.38	89.49	88.59	87.68
69	95.49	94.74	93.94	93.12	92.29	91.42	90.57	89.70	88.80	87.90	86.99
68	94.87	94.08	93.29	92.47	91.62	90.75	89.89	89.02	88.11	87.21	86.29
67	94.22	93.42	92.63	91.80	90.94	90.07	89.20	88 33	87.42	86.51	85.58
66	93.57	92.76	91.95	91.12	90.26	89.38	88.51	87.63	86.71	85.80	84.86
65	92.91	92.09	91.28	90.43	89.57	88.69	87.80	86.92	86.	85.08	84.13
64	92.25	91.42	90.59	89.72	88.86	87.97	87.08	86.20	85.27	84.35	83.40
63	91.58	90.75	89.88	89.	88.16	87.25	86.36	85.47	84.54	83.61	82.66
62	90.90	90.03	89.16	88.29	87.46	86.52	85.63	84.72	83.79	82.86	81.91
61	90.21	89.31	88.44	87.57	86.71	85 78	84.89	83.97	83.04	82.10	81.15
60	89.48	88.58	87.71	86.83	85.95	85.03	84.14	83.21	82.27	81.33	80.38
59	88.74	87.83	86.98	86.09	85.20	84.28	83.37	82.45	81.50	80.55	79.60
58	87.99	87.08	86.22	85.34	84.44	83.51	82.59	81.67	80.72	79.76	78.79
57	87.24	86.33	85.45	84.58	83.67	82.73	81.81	80.89	79.93	78.96	77.97
56	86.47	85.57	84.69	83.79	82 89	81.94	81.03	80.09	79.13	78.15	77.15
55	85.69	84.79	83.91	82.99	82.09	81.15	80.23	79.29	78.32	77.34	76.33
54	84.90	84.	83.12	82.20	81.29	80.35	79.43	78.40	77.49	76.51	75.51
53	84.10	83.20	82.31	81.39	80.47	79.54	78.60	77.61	76.65	75.67	74.68
52	83.30	82.41	81.51	80.58	79 66	78.72	77.77	76.74	75.82	74.84	73.84
51	82.49	81.55	80.69	79.77	78.84	77.89	76.93	75.96	74.99	74.	73.
50	81.66	80.76	79.85	78.93	77.99	77.04	76.03	75.07	74.11	73.12	72.12
49	80.83	79.93	79.01	78.08	77.14	76.18	75.13	74.18	73.23	72.23	71.24

TABLE NO. I.—CONTINUED.

	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°
48	79.99	79.08	78.15	77.22	76.28	75.32	74.30	73.35	72.37	71.36	70.33
47	79.14	78.22	77.28	76.35	75.41	74.46	73.48	72.49	71.50	70.48	69.42
46	78.27	77.36	76.41	75.47	74.53	73.56	72.58	71.58	70.58	69.55	68.49
45	77.40	76.48	75.53	74.59	73.65	72.66	71.67	70.67	69.66	68.61	67.55
44	76.51	75.60	74.63	73.69	72.75	71.75	70.74	69.75	68.72	67.66	66.59
43	75.62	74.70	73.72	72.78	71.84	70.84	69.80	68.82	67.78	66.70	65.62
42	74.71	73.78	72.81	71.85	70.89	69.86	68.84	67.89	66.80	65.74	64.59
41	73.79	72.85	71.89	70.92	69.94	68.88	67.87	66.85	65.83	64.77	63.56
40	72.85	71.90	70.93	69.95	68.96	67.91	66.89	65.91	64.85	63.77	62.77
39	71.90	70.93	69.97	68.97	67.97	66.94	65.90	64.87	63.85	62.76	61.68
38	70.92	69.95	68.97	67.97	66.96	65.94	64.90	63.86	62.84	61.72	60.64
37	69.93	68.96	67.97	66.96	65.95	64.93	63.90	62.84	61.77	60.68	59.59
36	68.92	67.95	66.95	65.93	64.91	63.89	62.86	61.80	60.72	59.63	58.54
35	67.90	66.92	65.92	64.90	63.87	62.84	61.81	60.75	59.67	58.58	57.48
34	66.86	65.86	64.88	63.84	62.80	61.76	60.72	59.66	58.58	57.49	56.38
33	65.82	64.81	63.82	62.78	61.73	60.68	59.63	58.56	57.49	56.39	55.28
32	64.75	63.71	62.74	61.69	60.63	59.58	58.52	57.45	56.37	55.15	54.12
31	63.66	62.61	61.65	60.59	59.53	58.47	57.40	56.33	55.25	54.11	52.96
30	62.56	61.55	60.54	59.47	58.40	57.33	56.25	55.15	54.04	52.91	51.79
29	61.44	60.44	59.42	58.34	57.26	56.18	55.10	53.97	52.83	51.70	50.58
28	60.31	59.29	58.26	57.16	56.07	54.97	53.87	52.74	51.60	50.46	49.32
27	59.16	58.10	57.05	55.97	54.88	53.76	52.63	51.50	50.37	49.21	48.01
26	57.96	56.89	55.81	54.75	53.60	52.48	51.35	50.20	49.06	47.89	46.70
25	56.72	55.65	54.55	53.43	52.31	51.19	50.06	48.90	47.74	46.56	45.38
24	55.45	54.32	53.25	52.11	50.98	49.84	48.68	47.53	46.37	45.17	44.
23	54.15	53.03	51.91	50.78	49.65	48.48	47.30	46.15	44.99	43.79	42.59
22	52.75	51.70	50.54	49.36	48.21	47.02	45.85	44.69	43.51	42.33	41.27
21	51.34	50.31	49.15	47.94	46.76	45.56	44.40	43.23	42.02	40.82	39.58
20	49.92	48.84	47.63	46.44	45.25	44.04	42.87	41.68	40.46	39.29	37.99
19	48.50	47.26	46.09	44.88	43.67	42.46	41.27	40.04	38.83	37.58	36.35
18	46.86	45.65	44.46	43.21	42.01	40.79	39.55	38.30	37.09	35.86	34.62
17	45.21	43.99	42.76	41.47	40.26	39.01	37.77	36.53	35.29	34.05	32.80
16	43.44	42.20	40.90	39.63	38.38	37.13	35.89	34.59	33.40	32.16	30.90
15	41.54	40.24	38.97	37.65	36.37	35.10	33.87	32.59	31.33	30.18	28.93
14	39.38	38.11	36.83	35.48	34.19	32.93	31.71	30.47	29.28	28.10	26.87
13	37.11	35.80	34.48	33.13	31.83	30.62	29.43	28.25	27.10	25.97	24.80
12	34.49	33.14	31.86	30.52	29.30	28.14	27.02	25.92	24.83	23.73	22.69
11	31.44	30.08	28.99	27.74	26.59	25.53	24.52	23.51	22.51	21.50	20.57
10	27.99	26.84	25.88	24.80	23.84	22.89	21.99	21.09	21.07	19.24	18.27
9	24.30	23.40	22.60	21.82	21.07	20.24	19.46	18.64	17.82	16.97	15.97
8	20.53	20.03	19.50	18.90	18.29	17.61	16.92	16.23	15.48	14.72	13.87
7	17.05	16.80	16.49	16.07	15.64	15.05	14.48	13.85	13.18	12.15	11.73
6	13.91	13.84	13.66	13.38	13.03	12.59	12.12	11.56	10.97	10.43	9.63
5	11.18	11.15	11.17	10.18	10.63	10.26	9.85	9.37	8.83	8.25	7.58
4	8.49	8.68	8.65	8.55	8.34	8.04	7.69	7.27	6.76	6.23	5.63
3	6.33	6.42	6.44	6.39	6.13	5.94	5.63	5.24	4.52	4.34	3.72
2	4.20	4.35	4.38	4.35	4.19	3.97	3.68	3.32	2.89	2.39	1.87
1	2.33	2.43	2.45	2.43	2.28	2.08	1.81	1.44	1.10	.87	.74

[*To be continued.*]

TO THE COLLEGE OF PHARMACY.

[*Read October*, 1825.]

I beg leave to furnish an alteration in the recipe which I sent to you some time past, for the preparation of Syrup of Ginger.

Ginger bruised sufficient to occupy the space of one gallon; alcohol one and a half gallon—shake frequently for one month, and then filter as it may be needed for use. Of this saturated tincture, take from two to four gills, and add to each gallon of simple syrup—evaporate the alcohol and the syrup will be transparent.

I change the dilute spirit for alcohol, because a weak spirit will take up so much of the mucilage of the ginger as to make the syrup cloudy. The alcohol does not take up that mucilage, and therefore should always be employed in making tinctures for the preparation of syrups which we desire to have transparent.

Very respectfully,

Jos: BRINGHURST.

Wilmington, Del.

ALTERATIONS,

ADOPTED IN THE LONDON PHARMACOPŒIA, OF 1824.

MATERIA MEDICA.

NEW ARTICLES.

ACIDUM ACETICUM FORTIUS,

Distilled from wood, sp. gr. 1.046; 100 grains saturate 87 grains of crystallized sub-carbonate of soda.

BISMUTHUM.
KRAMERIÆ RADIX.
LACTUCA.
STRAMONII SEMINA ET FOLIA.
TIGLII OLEUM.
COLCHICI SEMINA.
CONII SEMINA.
DIGITALIS SEMINA.

—

ARTICLES RESTORED.

ANTIMONII VITRUM.
CUBEBÆ BACCA.
HELENII RADIX.

—

PRÆPARATA ET COMPOSITA.

—

ALTERED FORMULA.

BENZOIC ACID.

The acid is obtained by sublimation as directed in the old Pharmacopœias.

—

ACETATE OF POTASSA.

Take of sub-carbonate of potassa, a pound,
Strong acetic acid, two pints,
Boiling distilled water, two pints:

Having first mixed the acid and water, add it to the sub-carbonate of potassa, till it ceases to excite effervescence and filter; evaporate the liquor in a water bath, until ebullition ceases. Then expose it to a heat gradually increased, and again evaporate until a pellicle ap-

pears on the surface; remove this pellicle and dry it on bibulous paper. Continue the evaporation of the liquor, and remove and dry the pellicles in the same manner.

—

Carbonate of Potassa.

—

Carbonate of Soda.

—

The process of the Edinburgh college, for preparing these salts, by passing a stream of carbonic acid gas through solutions of the sub-carbonates, is adopted.

—

Lime Water,

Is directed to be made with cold instead of hot water.

—

Tartarised Antimony.

Take of glass of antimony, very finely powdered,
Supertartrate of potassa, in powder, of each a pound,
Boiling distilled water, a gallon;

Accurately mix the glass of antimony and the supertartrate of potassa, and add them by degrees to the boiling distilled water, constantly stirring it with a spatula; boil for a quarter of an hour and set it by. Filter the solution when cold, and evaporate the filtered liquor so that crystals may form.

—

Wine of Tartarised Antimony.

Take of tartarised antimony, one scruple,
Boiling distilled water, eight fluid-ounces,
Rectified spirit, two fluid-ounces;

Dissolve the tartarised antimony in the boiling distilled water; then add the spirit to the filtered liquor.

Wine of Iron.

Take of iron a drachm,
Supertartrate of potassa in powder, six drachms,
Distilled water, two pints, or a sufficient quantity,
Proof spirit, twenty fluid-ounces;

Rub the iron and the supertartrate of potassa together, and expose the mixture to the air for six weeks, in a shallow glass vessel, with one fluid-ounce of the water, stirring it daily with a spatula, and occasionally adding distilled water, so that it may be always moist. Then dry by a gentle heat, reduce it to powder, and mix it with thirty fluid-ounces of the distilled water. Filter the solution, and when filtered, add the spirit.

—

Submuriate of Mercury.

Take of purified mercury, by weight, four pounds,
Sulphuric acid, by weight, thirty ounces,
Muriate of soda, a pound and a half,
Muriate of ammonia eight ounces;

Boil two pounds of the mercury with the sulphuric acid in a glass vessel, until the sulphate of mercury is dry. When it has cooled, rub it with two pounds of the mercury in an earthenware mortar till they are well mixed. Then add the muriate of soda, and rub them together until globules are no longer visible. Then sublime. Reduce the sublimate to a very fine powder, pass it through a sieve, and mix it well with the muriate of ammonia previously dissolved in a gallon of boiling distilled water. Set it by, that the powder may subside. Pour off the liquor and wash the powder frequently with

boiling distilled water, until solution of ammonia, dropped in, produces no precipitate. Lastly, reduce it to a very fine powder in the manner directed for the preparation of the chalk.

—

Acetate of Lead.

A pint of strong acetic acid is substituted for a gallon and a half of distilled vinegar as formerly used.

—

Oxide of Zinc.

Take of sulphate of zinc, a pound,
Solution of ammonia, a pint, or a sufficient quantity,
Distilled water a pint;

Dissolve the sulphate of zinc in the distilled water, and add as much of the solution of ammonia as will suffice for the entire precipitation of the oxide of zinc. Having poured off the clear liquor, wash the powder repeatedly with distilled water, and dry it on a sand-bath.

—

Cinnamon Water.

—

Peppermint Water.

—

Spearmint Water.

—

Pennyroyal Water.

—

These distilled waters are directed to be distilled from the bark or herbs, as formerly, or from the essential oil and water; 5 scruples of oil of cinnamon, and 3 drachms, by weight, of the oils of peppermint, spearmint and pen-

nyroyal, are substituted for the quantity of bark or herbs, which yield a gallon of distilled water.

—

INFUSION OF CALUMBA,

Is doubled in strength.

—

COMPOUND EXTRACT OF COLOCYNTH.

Diluted alcohol is substituted for water, and 3 drachms of white soap added to the formula of the old Pharmacopœia.

—

SPIRIT OF CINNAMON.

Five scruples, by weight, of the essential oil may be used instead of a pound of the bark.

—

SPIRIT OF PEPPERMINT.

—

SPIRIT OF SPEARMINT.

—

SPIRIT OF PENNYROYAL.

—

SPIRIT OF ROSEMARY.

—

Instead of the dried herbs, 6½ scruples of the oil of peppermint and spearmint, 7 scruples of the oil of pennyroyal, and 1 oz. of the oil of rosemary may be used for obtaining a gallon of the respective spirit.

—

TINCTURE OF MYRRH.

—

TINCTURE OF GINGER.

—

Rectified spirit is directed in place of proof spirit.

—

Wine of Aloes,

Is directed to be made with four pints of water and four pints of proof spirit, in place of two pints of the latter, and six pints of wine.

—

Wine of Ipecacuanha.

Take of ipecacuanha root bruised, two ounces,
Proof spirit, twelve fluid-ounces.
Distilled water, twenty fluid-ounces;
Macerate for fourteen days, and strain.

—

Wine of Opium.

The same proportions of proof spirit and water as in the above preparation are substituted for the wine formerly ordered.

—

Wine of White Hellebore.

Take of white hellebore root sliced, eight ounces,
Proof spirit, a pint,
Distilled water, a pint and a half;
Macerate for fourteen days, and strain.

—

Confection of Opium.

Two drachms of gum tragacanth are added to the old formula.

—

Compound Pills of Gamboge.

Take of gamboge in powder, a drachm,
Extract of spiked aloe, in powder, a drachm and half,

Ginger in powder, half a drachm,
Hard soap, two drachms;

Mix the powders together; then, having added the soap, beat the whole together until incorporated.

—

Compound Pills of Calomel.

Half a drachm of alcohol in place of the mucilage of gum arabic.

—

Cumin Plaster.

An ounce and a half each of olive oil and of water, are added to the old formula.

—

Plaster of Spanish Flies.

The quantity of lard is reduced from a pound to half a pound.

—

Plaster of Opium.

Half a pint of water is added; and the plaster boiled till the water is evaporated.

—

Compound Plaster of Pitch.

Two fluid-ounces each, of olive oil and water, are added to the old formula.

—

NEW PREPARATIONS.

Tartaric Acid.

Take of supertartrate of potassa two pounds and a half,
Boiling distilled water, three gallons,
Prepared chalk a pound,
Sulphuric acid a pound;

Boil the supertartrate of potassa with two gallons of the distilled water, and add the prepared chalk by degrees, until it ceases to cause effervescence. Set by the mixture, that the tartrate of lime may subside; pour off the liquor and wash the tartrate of lime frequently with distilled water until it becomes tasteless. Then pour upon it the sulphuric acid diluted with a gallon of boiling distilled water, and set them by for twenty-four hours, occasionally stirring them. Strain the liquor and then evaporate it by a water bath, so that crystals may form.

—

Sub-Nitrate of Bismuth.

Take of Bismuth, an ounce,
Nitric acid, a fluid-ounce and a half,
Distilled water, three pints;

Mix six fluid-drachms of the distilled water with the nitric acid, and dissolve the bismuth in this mixture; then filter. Mix the remaining water with the filtered solution, and set it by that the powder may subside. Then having poured off the supernatant liquor, wash the subnitrate of bismuth with distilled water and dry it, wrapped in bibulous paper, in a gentle heat.

—

Extract of Lettuce.

Prepared from the fresh leaves in the same manner as the extracts of hemlock and henbane.

—

Extract of Thorn Apple.

Take of thorn apple seeds a pound,
Boiling water a gallon;

Macerate for four hours in a covered vessel near the fire; then take out the seeds and bruise them in a stone

mortar; having bruised them return them into the liquor. Then boil down to four pints and strain the liquor while hot. Lastly, evaporate until it has a proper consistence.

—

Ammoniated Spirit of Meadow Saffron.

Take of meadow saffron seeds bruised, two ounces,
Aromatic spirit of ammonia, a pint;
Macerate for fourteen days, and strain.

—

Wine of Meadow Saffron.

Take of meadow saffron root, fresh and sliced, a pound,
Proof spirit, four fluid-ounces,
Distilled water, eight fluid-ounces;
Macerate for fourteen days, and strain.

—

Syrup of Sarsaparilla.

Take of sarsaparilla root sliced, a pound,
Boiling water, a gallon,
Refined sugar, a pound;
Macerate the root in the water for twenty-four hours; then boil down to four pints, and strain the liquor while hot; then add the sugar, and evaporate to a proper consistency.

—

Confection of Black Pepper.

Take of black pepper,
Elecampane root, each a pound,
Fennel seeds, three pounds,
Honey, Refined sugar, each two pounds;
Rub the dry ingredients together, into a very fine powder; then having added the honey, rub them till the whole is incorporated.

SELECTED PAPERS.

On the Production and Nature of Oil of Wine, (Oleum Æthereum of the London Pharmacopœia.) By Mr. H. Hennell, *Chemical Operator at Apothecaries Hall.*

Mr. R. Phillips, in his translation of the London Pharmacopœia, appearing to doubt the existence of oil of wine, as a distinct substance, I was induced carefully to repeat the process we usually adopt in our laboratories for obtaining it.

Half a gallon of rectified spirit of wine (sp. gr. 830,) was mixed with an equal bulk of sulphuric acid, and distilled in a glass retort; the products were ether, water, sulphurous acid, and about four ounces of a yellow fluid floating upon the water, which, when separated and washed with solution of carbonate of potash as long as there was any trace of sulphurous acid, was a solution of true oil of wine in ether. The ether may be removed, either by spontaneous evaporation, or it may be distilled off with a very gentle heat. The oil thus obtained, and which amounts to about two ounces, is a yellow fluid, resembling, in appearance, oil of lavender or peppermint; perhaps rather more viscid. It has a specific gravity of 1.05. After being kept a few months, it becomes more viscid, and a number of prismatic crystals form in it, which, in many of their characters, very much resemble Napthaline; they are soluble in ether and alcohol, and

crystallize from both those solvents in very slender prisms; they melt with a very slight heat, and sublime unaltered; in warm sulphuric acid they dissolve, forming a pink solution; they dissolve in cold nitric acid, forming a deep red solution, similar to that of morphia in nitric acid; heat destroys this colour instantly; and the solution, after boiling, on being diluted with water, throws down a white flaky precipitate. The crystals are insoluble in muriatic and in acetic acids, and in the caustic alkalies, hot or cold.

The oil is soluble in ether and alcohol, but insoluble in water; distilled with water, it passes over like the greater number of the essential oils, without having undergone any alteration; but when a portion was attempted to be distilled alone, the greater part came over in the form of a thick oily matter, a considerable quantity of sulphurous acid was formed, and charcoal and a little sulphuric acid were left in the retort. With a view to get rid of a portion of acid, which the carbonate of potash had apparently not removed, some of the oil was heated in a solution of caustic potash; it diminished considerably in bulk, and became much more viscid than before: it was separated from the potash solution by the action of ether, and when the ether was distilled off, there remained a yellow oil, with very little fluidity, which evaporated entirely when heated, without any appearance of decomposition or evolution of sulphurous acid, and which, in a few days, concreted into a mass of prismatic crystals, having all the characters of those before described. The potash solution, evaporated to dryness, afforded a residue somewhat like acetate of potassa in appearance; upon heating a few grains of it, it took

fire, and burnt with a flame resembling that of alcohol, and sulphate of potash remained; it dissolved in hot alcohol, and the solution deposited, on cooling, crystals in the form of pearly scales; in short, it had those characteristics which have been ascribed to sulphovinate of potassa; I therefore consider *oil of wine* as a compound of sulphovinic acid, and the peculiar crystallizable oil which I have described.

There are two facts which render it probable that oil of wine, when obtained, as in the above process, from alcohol and sulphuric acid, is a product of the decomposition of sulphovinic acid; namely—first, that when alcohol and sulphuric acid are mixed in equal bulks, sulphovinic acid is formed in great abundance; nearly five ounces of sulphate of lead were obtained from the sulphovinate of that metal, formed by neutralizing the acid resulting from a mixture of four ounces of alcohol with an equal bulk of sulphuric acid, the mixture having been allowed to become cold before it was saturated—and secondly, oil of wine, or a fluid exactly resembling it, is obtained when any of the sulphovinates are carefully decomposed by heat.

Dr. Grant on the Ova of Sponge.—When we cut a thin piece off the surface of a living sponge, and look down through one of its pores with the reflecting microscope, we perceive immediately beneath the projecting spicula which defend the pore, a very delicate net work of gelatinous threads thrown over the entrance of the tube. This piece of structure is so fine, as to be per-

fectly invisible to the naked eye; it consists of five or six threads, which pass in from the sides of the tube to be connected with a central mesh, so that there are six or seven meshes thus formed; and while this soft apparatus is beautifully defended by the protecting spicula of the pore, it serves still farther to guard the interior of the animal from the smallest particles of sand, or the minutest visible animalcules. Along the whole interior of the pores and tubes, there is a thin gelatinous matter enveloping every fibre, and filling all the interstices between the fasciculi. This gelatinous matter is transparent and colourless, and so little consistent, that it runs down like the white of an egg, when the sponge is first torn from the rock, and suspended between the fingers; the microscope detects no trace of organization in it; by filling up the inequalities of the sides of the tubes, it smoothens these passages for the small streams. Every part of the gelatinous matter is covered with minute granular bodies, which are distinctly seen in every species of sponge by the weakest magnifier of the microscope. These granular bodies are represented in the plates of Donati, of a spherical form, adhering to the quadriradial fibres of what he has named the Alcyonium primum Dioscoridis. They are quite invisible to the naked eye; they escape along with the gelatinous matter, and compose the greater part of it; they are connected with each other by the gelatinous matter, and probably, through the same medium, have some connexion with the spicula, along which they are placed. No part in the organization of the sponge is more constant and obvious, than these granular transparent bodies lining the interior of every canal, from the pores to the fecal orifices. Their form is not quite sphe-

rical, but somewhat lengthened, or ovoidal, and they are always attached by one extremity to the gelatinous matter, while their opposite end is seen to project, free into the cavity of the canals. Through the greatest magnifier of the microscope, no difference can be detected in their forms in different species of sponge; they all appear to be enlarged and rounded at their free projecting extremity; and when watched with attention, we distinctly perceive, that they possess some power of spontaneous motion, both when in connexion with sides of the canals, and when lying isolated at the bottom of water. The ova of the sponge, are quite visible to the naked eye, and are seen disseminated through the whole texture of the animal in the winter season. They are bodies of a yellow colour, somewhat translucent, pear-shaped, tapering, more or less, at their narrow end, in different species; their whole outer surface is covered with delicate projecting ciliæ; and when viewed through the microscope, in connexion with the parent, we see that the rapid vibration of these ciliæ produces a distinct current in the water immediately around them, flowing always from their rounded free end, towards their tapering fixed extremity; thus assisting the small granular bodies in producing the currents of the sponge, during the period of their attachment to the body. They separate from the canals, and are propelled through the fecal orifices early in spring. None of these ova are seen in the sponge in summer, though we can detect no difference in the velocity of the currents at that period. For some time after they are propelled from the interior of the sponge, they swim about by means of the ciliæ on their surface; and exhibit all those extraordinary phenomena of spontaneous

motion which Cavolini, nearly half a century ago, discovered in the ova of the Gorgonia and Madrepore. They at length fix themselves, like the ova alluded to, on a spot favourable for their growth; they lose entirely their original form, and become a flat, transparent, circular film, through which horny fibres shoot; they soon spread and assume a form, somewhat similar to that of the parent.

Salts of Strontian and Barytes.—Moretti finds that strontian and barytic earths have a stronger affinity for arsenic than for sulphuric acid; that the succinates and arseniates of strontian are rather easily soluble, while those of baryta are insoluble—a character which affords a ready means of distinguishing from each other, two earths so nearly allied together.

Cooling of Glass.—Ballani finds, that after glass has been exposed to a great heat, on cooling, it never regains its original volume.

Iron Tanks.—Captain Hall says, "I once filled a tank with clear water, at Portsmouth harbour, and having carried it four times across the torrid zone, and round Cape Horn, brought it back again, more than two years afterwards, in the same tank, not in the least degree discoloured, and in all respects as good as when it was first taken up from the spring."

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